Emotion Recognition of students during project review

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Abstract— **Human expressions are vital to state their emotions. Facial expression recognition has always been a challenging task in recent times and also proved that it can be ef*ciently used in many areas. According to a recent survey, people usually try hiding their emotions at times when they are to be monitored. Almost all the decisions we take are driven by emotions. Marketing research has also proven that predicting sentiments correctly can be a huge source of growth for businesses and other sectors. It is very crucial for social interaction and has gained extensive attention from researchers for their research in various range of methods. The Convolution neural network as a powerful image processing and artificial intelligence network make use of deep learning to deal with both descriptive and analytical tasks using different elements and visions of smart machines to deploy the image and video recognition. Emotion recognition monitors the procedures of various emotional aspects of a human and displays the particular human emotion using the various concepts of Convolution neural networks. We have added many techniques of CNN to the FER-2013 data set and algorithms like Haar Cascade for facial recognition and frame development, and Image pre-processing techniques where the data set has been trained with various weights. The FER-2013 data set was created by gathering the results of a Google image search of each emotion and synonyms of the emotions. The data set has a total of 5,876 labeled images of 123 individuals. Out of these images, we used 4,113 images for training, 881 for dev, and 881 for the test. The main aim is to detect and recognize the facial expressions of students during their presence in any project review. Keeping in mind all the various methods to recognize facial emotions, a very important aspect is that using gray scaled images always makes the work easier without interrupting the quality and accuracy of the model.**

Keywords — HAAR CASCADE, FER-2013,Human Emotion Detection, CNN.

I. INTRODUCTION

Facial emotions take an essential part in the day - to - day life. The state of a human being can be recognized by the emotion on the face. The face of a emotional feelings is to show a psychological picture of this feeling of near past, which is once again linked to a satisfactory state of joy or less satisfaction. Also, Nowadays getting a true and unbiased response by the people or gathering for any event organized is very rare. People pretend to the organizer something but inside the true feeling is different and is hidden from everyone else outside. So, the emotions on the face can be used to see the actual feeling..

II. LITERATURE SURVEY

Frequent times there were many studies done for image recognition which is the main functionality of the project performed by us. Machine Learning, Deep learning is the aspects that deployed the various regions of attractions to solve every practical problem in particular. "Audience Feedback Analysis using Emotion Recognition" [1] The models of CNN are used to present and evaluate the performance of image recognition on different datasets. "Facial Emotion Detection Using Deep Learning" [2] System has to train by using real data of human face reactions. For example, if the system has to detect an angry face then the first system has to be acquainted with the angry face. "Extended Deep Neural Network for Facial Emotion Recognition" [3] Image normalization is an important pre-processing technique to decrease the inner-class feature mismatch which could be observed as intensity offsets.

III. WORKING OF THE SYSTEM

In this system we are using the data set called FER-2013. This data set contains loads of images of different emotions. After training the system the input provided is either the live video using the web cam or the prerecorded video. Extraction of the frame using frame extraction program is done. After the frames are extracted, the next step is to detect the faces in those frames using Deep Neural Network algorithm of machine learning practices. These cropped faces of all the people repeatedly from all the frames are then stored in a folder which are used as input for detecting the emotion of each individual separately. Pre-processing is used to remove conditions of light and noise, threshold. Haar cascade is used to detect and draw rectangular boxes around the face. For each of the faces cropped the emotion is classified and is displayed on the screen.

Data set and Input

In this project, the data set used is in the form of 48*48 mm sized Grey scaled images where these images are used to train the machine to detect the emotion from a picture. The training data set is taken in gray scale images because the faces cropped from the frames will also be in the for of rrey scaled images for machine feature extraction which is much more easier and accurate rather than coloured images.

Face Extraction and Facial Detection

The first step is to extract out the frames from the live stream or the recorded video using various frame extraction algorithms in Open-CV and the nest stage is to recognize the face in the frame using Haar Cascade algorithm which facilitates the model to recognize and provide the accurate reading.

Emotion Generation

The final step of the program is to generate the emotional value from the images of the faces cropped. The program runs in a loop where all the faces that are extracted or cropped are analyzed and emotion is generated based on the Convolution neural network algorithm for all the images.

IV. SYSTEM ARCHITECTURE
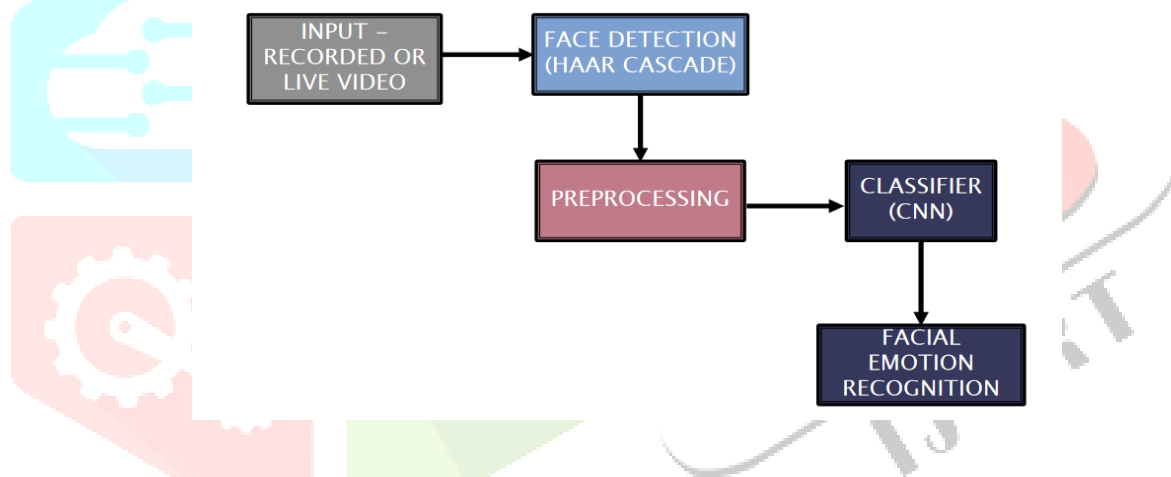
The user data is given as input which gets pre-processed and segmented by CNN. The images are detected with help of Image data generators for both testing and validation. A bounding box is drawn around the objects along with label to get a labeled output image using Haar Cascade. While when a streaming live video or a recorded video is provided as the input data, the system iterates throughout the frames of the live stream video or the webcam and displays the recognized emotion as a label on the bounding box.

V. ACTIVITY DIAGRAM
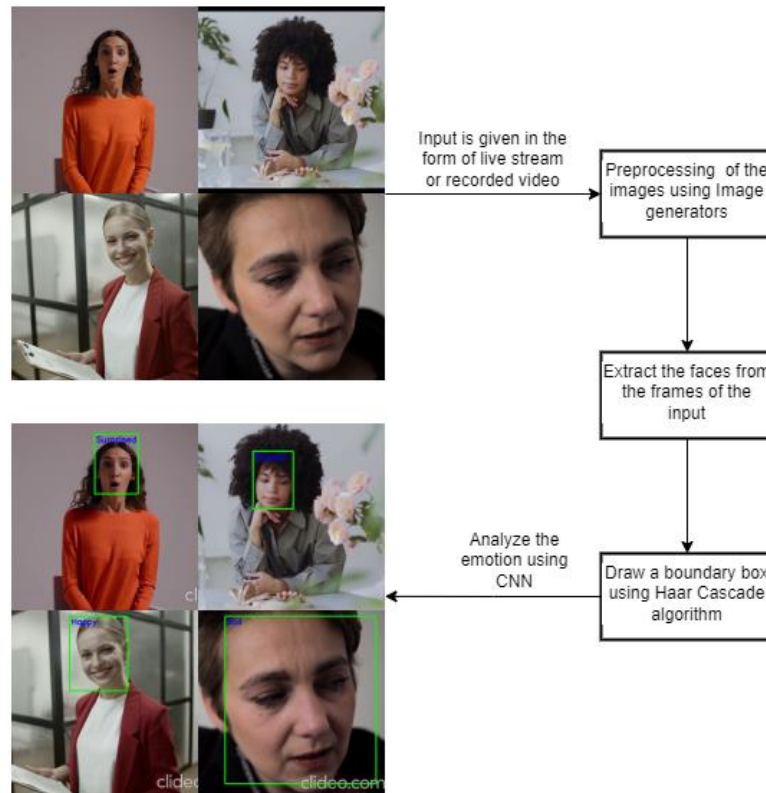
To enter into the system, the input has to be a live stream video or a prerecorded video and with the use of Open-CV library the video is read in the form of the images trained to the data set and create borders with the help of Open-CV library, Haar cascade and also resize the image to 48*48 sized gray scaled images and feed the input to CNN algorithm, the CNN then checks for the recognition of the emotion using CNN methods. Later the model fetches the result and displays the label name on the boundary drawn which is represented as an output.

VI. COMPARISON WITH OTHER ALGORITHMS

Various algorithms such as SUM (Support Vector Machines), K- Nearest Neighbour (KNN), Deep Belief networks, Recurrent Neural Networks (RNM), were used for emotion detection of a human in earlier implementations of emotions, but there were many flaws around the algorithms such as processing time and authenticity. Hence CNN is used in our implementation which is a chief group to perform image detection, facial recognition etc. CNN is a neural network technology stimulated from biotic procedure in which link. relationship and neurons look like configuration of human pictorial cortex. Computers perceive input image as collection of pixels and this enhances the image resolution. On the particulars of image resolution, this will discover and drive the [h x w x d]. It contains 3 levels: (i) Convolution layer, (ii) Pooling layer and (iii) Fully connected Layer used for processing the input.

VII. CONCLUSION

From this we came to know that face is the primary channel through which emotions are expressed and using different emotions, individual make their feelings known to others. These expressions are conveyed non verbally that plays an important role in personal relations and hence can be detected either by creating a live environment or in the form of recorded video.

VIII. FUTURE WORK

As an enhancement to this project, the following can be implemented:

- In digital images, automatic face and expression detection can be included as a feature in digital camera, security systems etc.
- We intend to future develop the application in order to consider for emotion detection other stimuli also, such as voice and body posture and to compare our final solution with existing ones in terms of performance and emotion detection accuracy.
- Emotion recognition can be used to understand how candidates feel during interviews and to measure how they react to certain questions.
- Can be used in the neurology of vision and vision disorders.
- For the mental diagnosis and human social/physiological interaction detection.
- Can be used in the feedback system in the sector of real time implementation.
- Law enforcement, surveillance and monitoring.

IX. REFERENCES

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